

QLogic Corporation
QLA2100F PCI Fibre Channel Adapter
RELEASE NOTES FOR SYMMETRIX ICDA SYSTEM
UPDATED: July 27, 1999

This release note file contains the latest product information for the QLogic QLA2100F-EMC PCI Host Bus Adapter (HBA) Solaris X86 driver. This release note also can be found on the QLogic web page: <http://www.qlc.com>
CAUTION: Solaris and Solaris x86 drivers are not interchangeable.
Please install the correct driver and refer to the list below for correct driver name.

HBA Part Number	Driver Name	Driver Package
=====	=====	=====
QLA2100F-EMC	qla2100	qla2100.Z

For complete installation and use instructions, please see the Symmetrix Fibre Channel Product Guide (P/N 200-999-642) and/or the QLogic Hardware Install Guide qla2000/2000F/2100/2100F/2200/2200F (P/N FC0151102-00).

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I. CD ROM CONTENTS

This CD ROM contains several drivers which are supporting for NT, NETWARE, SOLARIS, and SOLARIS x86 operating systems.

The QLA2100F driver for SOLARIS X86 is qla2100.Z Version 2.20 and resides under/cdrom/qla2100/sparcX86 directory. Currently, it is qualified to support Arbitrated Loop topology.

II. QLA2100F HBA ISSUES

There are no Known Adapter issues for qla2100F that effect Symmetrix operation.

- 1. ADAPTER FIRMWARE CONFIGURATION

During Boot Press <Alt> Q when the qla2100F banner is displayed to enter Fast!Util Options Menu.

Under Configuration Settings

- 1) Change all settings to default

Under Advanced Adapter Settings

- 2) Change Max Throttle to 20
- 3) Change Max Luns to 128

When exiting Fast!Util, save all changes and reboot.

III. QLA2100F SOLARIS X86 DRIVER ISSUES

The only known driver issue is related to a hub configuration. In a hubless or hub configuration the qla2100 driver 2.20 is designed to have an option of holding I/O indefinitely in the case the link is broken to the Symmetrix or the Symmetrix FA goes offline.

In the Hub environment, the only exception to this is if one port of the symmetrix is offline and then another port on a hub configuration link is broken. This will send a Loop initialization primitive sequence around the loop which the driver interprets as the Symmetrix being back online which will initiate the qla2100 driver to start executing and returning all holding commands.

1. HOST DRIVER CONFIGURATION VARIABLES

The following variables are found in the file /kernel/drv/qla2100.conf. The proper setting for driver configuration is crucial to Symmetrix and host integration.

Each HBA has its own settings for each of the 17 variables in the /kernel/drv/qla2100.conf file. (For example, if there are three QLA2100F HBAs installed, a variable must be created for each HBA.)

Example In the example below, a separate variable line is dedicated to each HBA (hba0, hba1, and hba2).

```
# Adapter hard loop ID enable.  
# 0 = disable, 1 = enabled  
hba0-enable-adapter-hard-loop-ID=1;  
hba1-enable-adapter-hard-loop-ID=1;  
hba2-enable-adapter-hard-loop-ID=1;  
# Adapter hard loop ID.  
# Range: 0 - 126  
hba0-adapter-hard-loop-ID=125;  
hba1-adapter-hard-loop-ID=125;  
hba2-adapter-hard-loop-ID=125;
```

Note: Using the same hard loop ID for all HBAs is a valid configuration only in a hubless loop connection.

Each HBA variable line in the qla2100.conf file corresponds to the instance number of the HBA in the /var/adm/messages file. In the above example, hba0 of hba0-enable-adapter-hard-loop-ID=1 corresponds to instance #0 in the /var/adm/messages file.

```

unix: QLogic qla2100 Fibre Channel Driver v2.20 Instance : 0
unix: pcplusmp: pci1077,1 (qla2100) instance #0
unix: vector 0x10 ioapic 0x4 intin 0x23 is bound to cpu 1
unix: PCI-device: pci1077,1@4, qla21000
unix: qla21000 is /pci@2,0/pci1077,1@4
unix: QLogic qla2100 Fibre Channel Driver v2.20 Instance : 1
unix: pcplusmp: pci1077,1 (qla2100) instance #1
unix: vector 0 x11 ioapic 0x4 intin 0x1f is bound to cpu 1
unix: PCI-device: pci1077,1@5, qla21001
unix: qla21001 is /pci@2,0/pci1077,1@5

```

2. HOST DRIVER CONFIGURATION VARIABLE VALUES

The following table lists the required settings for the variables in /kernel/drv/qla2100.conf for Non-Hub, Hub, and PowerPath environments (see note "a" listed below).

	No Hub	Hub(s)	PowerPath
hba0-frame-payload-size	1024	1024	1024
hba0-max-iocb-allocation	512	512	512
hba0-execution-throttle	20	20	20
hba0-login-retry-count	5	5	5
hba0-enable-adapter-hard-loop-ID	1	1	1
hba0-adapter-hard-loop-ID	125	see note b	125
hba0-login-timeout	4	4	4
hba0-enable-extended-logging	0	0	0
hba0-enable-64bit-addressing	0	0	0
hba0-enable-LIP-reset	0	0	0
hba0-enable-LIP-full-login	1	1	1
hba0-enable-target-reset	0	0	0
hba0-enable-database-storage	0	0	0
hba0-scsi-reset-delay	5000	5000	5000
hba0-link-down-error	0	0	1
hba0-port-down-retry-count	5	5	5
hba0-loop-down-timeout	60	60	60

- a. PowerPath is not currently supported in a hub environment.
- b. In a hub environment, the hard loop ID for each HBA must be unique.

Note: If any changes are made to the qla2100.conf file, the host must be rebooted for changes to take effect.

3. HOST DRIVER CONFIGURATION VARIABLE DESCRIPTION and VALID VALUES

hba0-frame-payload-size
Configuration flag for "maximum frame length."
Valid Values 512, 1024 or 2048 bytes
Default Value 1024 bytes

hba0-max-iocb
Allocation Number of commands queued internally within the HBA. Exceeding the adapter's buffers causes unnecessary retries, which impact

performance. Maximum value may be less depending on the size of the firmware.

Valid Values 1 - 750
Default Value 512

hba0-execution

Throttle Maximum number of commands sent to the LUN by the firmware. Exceeding a device's capabilities causes unnecessary command retries, which impact performance.

Valid Values 1 - 65635
Default Value 20

hba0-login-retry-count

Maximum number of retries to attempt when login into a device fails. Large values can cause long delays during initialization.

Valid Values 0 - 255
Default Value 8

hba0-enable-adapter-hard-loop-ID

Enables/disables the hard loop ID and activates (if enabled) the setting for variable hba0-adapter-hard-loop-ID

Valid Values 0 (disable) or 1 (enable)
Default Value 1

hba0-adapter-hard-loop-ID

Sets (if activated) the hard loop ID for the HBA during the Loop Initialization Process(LIP). If hba0-enable-adapter-hard-loop-ID and hba0-adapter-hard-loop-ID are not set as shown in Table 9-3, the LIP might fail and the host might not recognize the Symmetrix. These variables become crucial in a hub environment, since no device (Symmetrix target or host bus adapter) can have the same hard loop ID. The host HBA is conventionally assigned the highest Hard Loop ID, starting from 125 and working down (124, 123 122, etc.). The Symmetrix is conventionally assigned a lowest Hard Loop ID for each port, starting with 0 and working up (1, 2, 3, etc.). The following example is a configuration for three QLA-2100F HBAs with separate Hard Loop IDs:

Adapter hard loop ID.

Range: 0 - 126

hba0-adapter-hard-loop-ID=125;

hba1-adapter-hard-loop-ID=124;

hba2-adapter-hard-loop-ID=123;

Valid Values 1 - 125
Default Value 125

hba0-login-timeout

Login timeout (in seconds).

Valid Values 4 - 255 (sec)
Default Value 4

hba0-enable-extended-logging

Enables the driver extended error reporting capabilities.

Valid Values 0 (disable) or 1 (enable)
Default Value 0

hba0-enable-64bit-addressing

Enables the adapter to directly access memory above 4 gigabytes with 64-bit Direct Memory Access addressing.

Valid Values 0 (disable) or 1 (enable)
Default Value 0

hba0-enable-LIP-reset

Enables the adapter to issue a LIP reset during Fibre Channel reset. Only one of the variables hba0-enable-LIP-reset, hba0-enable-LIP-full-login, and hba0-enable-target-reset should be enabled at the same time.

Valid Values 0 (disable) or 1 (enable)
Default Value 0

hba0-enable-LIP-full-login

Enables the adapter to issue a LIP full login reset during Fibre Channel reset. Only one of the variables hba0-enable-LIP-reset, hba0-enable-LIP-full-login, and hba0-enable-target-reset should be enabled at the same time.

Valid Values 0 (disable) or 1 (enable)
Default Value 1

hba0-enable-target-reset

Enables the adapter to issue a LIP target reset during Fibre Channel reset. Only one of the variables hba0-enable-LIP-reset, hba0-enable-LIP-full-login, and hba0-enable-target-reset should be enabled at the same time.

Valid Values 0 (disable) or 1 (enable)
Default Value 0

hba0-enable-database-storage

Enables the driver to save device position on the Fibre Channel bus.

Valid Values 0 (disable) or 1 (enable)
Default Value 0

hba0-scsi-reset-delay

Delay after a reset before sending commands to the devices on the Fibre Channel bus.

Valid Values 0 - 255000 (millisec)
Default Value 5000

hba0-link-down-error

Disables all link down time out values if set to 0. The sd driver will not be notified

of any error conditions if the qla2100 driver detects a link down condition. If the

Symmetrix goes off line or the link with the host is broken for any reason, the qla2100 driver holds all pending I/Os indefinitely until the link is restored or the

Symmetrix rejoins the loop. In a Power Path environment this variable should be turned on (1) so the PowerPath driver will be notified of any error conditions.

Valid Values 0 or 1 (see Table 9-3)
Default Value 0

hba0-port-down-retry-count

Number of command retries to be done when devices are not responding on the Fibre Channel bus. Large values may cause long delays for fail over software to detect a failing device.

Valid Values 0 - 255
Default Value 5

hba0-loop-down-timeout

Time the driver will wait for a Fibre Channel loop to come up before reporting the failure. Small values may report transient errors that should be ignored.

Valid Values 0 - 240 (sec)

Default Value 60

IV. HOST CONFIGURATION FILES AND VARIABLES

1. /etc/system file

The following variables in the /etc/systems file should be set to maximize system performance. If any of these variables are changes the system must be reboot for changes to take effect.

sd_max_throttle

The sd_max_throttle variable is the maximum number of commands that the SCSI sd driver will attempt to queue to the HBA driver(qla2100). The default value is 256. This variable should be set to a value less than or equal to the maximum queue depth of each lun connected to each instance of the sd driver. If this is not done, then commands may be rejected because of a full queue condition and the sd driver instance that receives the queue full message will throttle down sd_max_throttle to 1. This will result in degraded performance. The variable is set in the /etc/system file as following:

```
set sd:sd_max_throttle=20
```

sd_io_time

The sd_io_time variable is command time out value. Setting this time out value to 120 seconds will prevent the host from issuing warning messages while non-disruptive operations are performed on the Symmetrix. In a power path environment this variable can be set to 0x3C (60 seconds)

```
set sd:sd_io_time = 0x78
```

scsi_options

The value scsi_options is a setting for SCSI options included as outlined in the bit meaning table bellow. Solaris 7 default SCSI settings are maximum Ultra Wide Speed. Since the /etc/system file can also affect other disks in the system, consider the effects of implementing the scsi_options=0x7F8 mask on the other disks.

```
set scsi_options=0x7F8
```

2. /kernel/drv/sd.conf

You must modify the host configuration files /kernel/drv/sd.conf to insure smooth integration from the host and Symmetrix.

Symmetrix devices are addressed on the Fibre Channel bus using the Symmetrix Hard Loop ID as a Target ID. There can be only one Target ID per Symmetrix port. A Target ID can have up to 128 luns. By default, Solaris X86 searches only for Target IDs; if LUN addressing is required, you must modify the file /kernel/drv/sd.conf. Definition lines must be added to sd.conf for every LUN of every target configured to the host in the Symmetrix. In a hubless connection, all Symmetrix ports can have the

same port ID. In a hub environment, each Symmetrix port must have a different Hard Loop ID (Target ID).

Example of sd.conf for Arbitrated Loop in a Hubless Environment

The following example is for a hubless loop configuration with a Target ID (Symmetrix Hard loop ID) of 0.

```
name="sd" class="scsi"
target=0 lun=0;
name="sd" class="scsi"
target=0 lun=1;
.
.
.
name="sd" class="scsi"
target=0 lun_6;
name="sd" class="scsi"
target=0 lun_7;
```

Note: Add only those Target/Lun definitions that are needed. In a direct-connect configuration, it is recommended that all Symmetrix ports be given the same Target ID. If different Hard Loop IDs are used for each port, lines must be added

to sd.conf for each LUN of each target. The fewer Target/Lun definitions in sd.conf, the less time it takes to boot.

Example of sd.conf for Arbitrated Loop in a Hub Environment:

The following example is for a hub loop configuration with two Target IDs of 0 and

1. Each target has 128 luns. For every Symmetrix port assigned to a host, there must be a target and series of LUNs configured in the sd.conf file. Targets are determined from the Symmetrix Hard Loop ID. In this example, 256 separate Target/LUN definitions are added to the sd.conf file.

```
name="sd" class="scsi"
target=0 lun=0;
name="sd" class="scsi"
target=0 lun=1;
.
.
.
name="sd" class="scsi"
target=0 lun_6;
name="sd" class="scsi"
target=0 lun_7;

name="sd" class="scsi"
target=1 lun=0;
name="sd" class="scsi"
target=1 lun=1;
.
.
.
name="sd" class="scsi"
target=1 lun_6;
name="sd" class="scsi"
target=1 lun_7;
```

VI. SUPPORTED ENVIRONMENT

QLA2100F PCI Host Bus Adapter including driver 2.20 have been qualified and supported to run on the following: NCR 4300, NCR 4400, Primergy 7xx running Solaris 2.7 Operating System.

1. There are no required patches for Symmetrix operation with the gla2100F in a Solaris 7 x86 environment. The following are patches that were qualified not to interfere with Symmetrix operation.

Qualified patches recommended by Solaris for Solaris 7_x86.

106794-01 SunOS 5.7_x86: ufsdump and ufsrestore patch
106961-01 SunOS 5.7_x86: Manual Pages for patchadd.lm and patchrm.lm
107039-01 SunOS 5.7_x86: apropos/catman/man/whatis patch
107023-02 CDE 1.3_x86: Calendar Manager patch

Other patches qualified to run with Symmetrix and Solaris 7_x86

107585-01 SunOS 5.7_x86: /usr/lib/vold/dev_cdrom.so.1 patch
107625-01 SunOS 5.7_x86: /usr/lib/fs/ufs/df patch
107679-01 OpenWindows 3.6_x86: Updated ATI video support
107685-01 SunOS 5.7_x86: sendmail patch
107690-01 CDE 1.3_x86: Actions patch
106945-02 SunOS 5.7_x86: /kernel/fs/fifofs patch
107172-02 SunOS 5.7_x86: Fixes for patchadd and patchrm
107444-03 SunOS 5.7_x86: Packaging utilities patch
106833-02 * SunOS 5.7_x86: auditreduce/c2audit/praudit patch
106979-01 * SunOS 5.7_x86: fix for /var/log/sysidconfig.log permission
107118-01 * SunOS 5.7_x86: libbsm patch
106737-02 * OpenWindows 3.6.1_x86: mailtool vacation security patch
107339-01 * OpenWindows 3.6.1_x86: KCMS configure security vulnerabilitypatch
106935-03 * CDE 1.3_x86: libDtSvc Patch

* Are security patches.